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A USERS' GUIDE TO CVCV PHONOLOGY*

1. Introduction

The late 1980s and early 1990s brought a substantial shift in the views on the role of structures and derivations in phonology. The 1985 and 1990 papers by Kaye, Lowenstamm and Vergnaud postulated a static view that underlined the role of the lexicon and the structural relations between the segments of phonological representations. The aim of this paper is to present the main tenets of the continuation of the approach proposed in the above-mentioned works: CVCV Phonology presented in Scheer (1998, 2004). The paper is structured as follows: section 2 is devoted to the introduction of the syllabic constituent structure in CVCV. Section 3 is a presentation of the Empty Category Principle (ECP), which constitutes the very essence of the approach in question. The aim of section 4 is to present a brief typology of phonological processes within CVCV, with emphasis on their motivation. Section 5 gives a short summary of the facts presented in this paper.

2. Constituent structure

Syllabic constituent structure in CVCV consists of a string of onsets and nuclei following each other monotonously. The idea was first presented in Lowenstamm (1996) and has since influenced the works of many phonologists (cf., among others, Scheer 1998, 2004, Rowicka 1999, Szigetvári 1999, Cyran 2003).

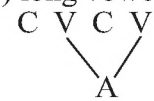
* This paper is meant to make the reader familiar with the very basic concepts and mechanisms of CVCV Phonology, as presented in Scheer (2004). For different versions of CVCV see, for example, Rowicka (1999), Szigetvári (1999), and Cyran (2003). Since, obviously, it is not possible to introduce all of the said mechanisms, this work is aimed at providing enough background for an introductory reader to be able to follow more advanced articles in the theory. The background knowledge required to get full advantage of the information given in this work embraces some aspects of Autosegmental Phonology (Goldsmith 1990) and Generative Phonology in general (Kenstowicz and Kisseberth 1979).

Basic structural configurations like complex onsets, coda-onset clusters, short and long vowels, geminates and diphthongs are shown in (1):

(a) branching onset

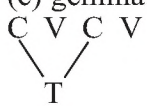
(b) coda-onset cluster

(c) long vowel

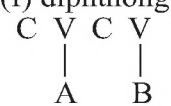


(d) short vowel

(e) geminate



(f) diphthong



where:
T – any obstruent
R – any sonorant
A/B – any vowel

As far as examples are considered, the configurations in (1a) and (1b) can be found in the initial and final clusters of the English word /trend/, respectively. Configurations (1c) and (1d) can be illustrated with the Italian /faato/ 'fate.' A geminate is present, for example, in Moroccan Arabic /htrrts/ 's/he breaks,' and a diphthong in English /skai/. All those examples are graphically depicted under (2) below:

(2) Examples of structural configurations in CVCV:

(a) /trend/

(b) /faato/

(c) /hɪrrɪs/

(d) /skai/

The main focus of the model are the phonotactic restrictions present in the phonological structure of the string and, to be more precise, the principles and parameters that govern the restrictions in questions. These principles and parameters manipulate two lateral relations whose source are vocalic positions: Government and Licensing. The former restricts the internal composition and/or organizations of a segment, the latter supports it.

The direction of both is, crucially, regressive. The effects of the lateral relations are most strikingly present in vowel-zero alternations, which lie at the very heart of CVCV, and the theory of lenition and fortition presented in Ségéral and Scheer (2001) and summarized in Scheer (2004). In particular, a vowel affected by Government may remain silent and its melodic material is not attached to the V position. Such a vowel loses its lateral potential, while a consonantal position that precedes it is not licensed and is prone to lenition. The effect of Government is also observed in the intervocalic position where the C position affected by the following V is also frequently weakened. On the other hand, consonants that follow governed vowels are affected only by licensing, which makes them strong. The role of the two lateral relations for the well-formedness of the phonological structure will be addressed in more detail later on in the paper (cf. section 3).

As the reader might have already noticed, the consonantal clusters in CVCV obligatorily enclose nuclei that are not melodically present on the surface. These empty nuclei constitute a characteristic feature of CVCV. They have been argued for by, among others, Kaye, Lowenstamm and Vergnaud (1990), Lowenstamm (1996, 1999), Gussmann and Harris (1998), Cyran (2003), and Scheer (2004). The arguments in support of empty nuclei in particular and empty categories in general in phonology are both theoretical and empirical in nature.

Firstly, both empty onsets and empty nuclei are a direct and inevitable consequence of the basic tenets of Autosegmental Phonology (Goldsmith 1990): empty C positions, empty V positions as well as floating melodic units must be generated automatically if the levels of melody and constituent structure are to be perceived as true autosegments. Secondly, the existence of empty nuclei and the fact that they are deprived of a lateral potential that their filled congeners have predicts a number of empirically correct effects. Among them are, for example, closed syllable shortening/laxing in Italian (Scheer 1998) and consonant weakening (/l/-vocalization) in Brazilian Portuguese (Scheer 2004) as well as the exact shape of syllables in many languages (the obligatory presence of vowels before clusters of falling sonority for example in English).

However, empty nuclei must be controlled. As has been underlined many times in the literature (cf., among others, Harris 1994: 191), the generative power of a representation that utilizes empty nuclei is enormous. Without any means to curtail it, any string of consonants enclosing empty nuclei is predict-

ed to occur. As there are restrictions on the possible number of consonants in a string in all languages, CVCV needs a mechanism to account for the existence of such restrictions. This mechanism has been inherited, with a number of modifications, from the ancestor of CVCV, i.e. Government Phonology (GP) (Kaye, Lowenstamm and Vergnaud 1990, Charette 1991, Gussmann and Kaye 1993, Harris 1994, Gussmann 2007), and it is known as the Empty Category Principle (ECP). This principle is discussed in some detail in the next section.

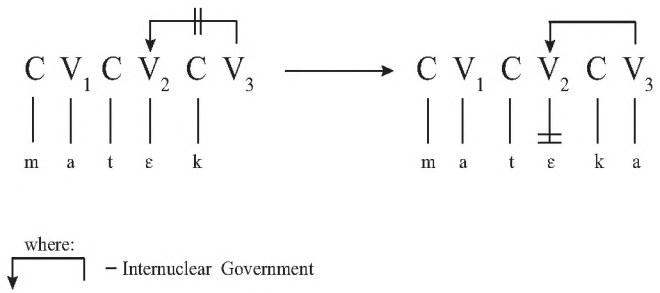
3. Handling Empty Categories in CVCV

There are three mechanisms in CVCV that allow a nucleus to remain silent so that it does not surface phonetically nor is deleted from the representation along with the C position that it licenses. These mechanisms are presented in (3):

(3) Empty Category Principle (adopted from Scheer 2004):
A nucleus remains phonetically unexpressed iff it is:
(a) subject to Internuclear Government from the following nucleus, or
(b) subject to parametrical government when domain-final, or
(c) enclosed within a domain of Infrasegmental Government.

Internuclear Government refers to a relation that a filled nucleus (governor) contracts with a preceding nucleus (governee) to the effect that the latter remains silent. It is responsible, for example, for the existence of vowel-zero alternations in Polish words like *matka* 'mother$_{SG.NOM}$' – *matek* 'mother$_{PL.GEN}$'. The representations of *matka – matek* are provided in (4):

(4) Polish vowel-zero alternations:



In (4a), the word /matɛk/ ends in an empty nucleus that is deprived of the governing potential. Not being subject to ECP, the empty category V_2 is pronounced. When an inflectional ending /a/ of nominative singular is added to the stem, the relation of Internuclear Government is contracted between V_3 and V_2 in (4b) to the effect that V_2 remains silent, which is indicated with the crossed association line.

The silencing of a domain-final nucleus is another development that CVCV inherited from GP.[1] In GP (and, by extension, in CVCV), it is assumed that every phonological domain ends in a nucleus. The idea of the existence of nuclei at the end of words has a theoretical basis. In GP (and later in many versions of CVCV), it is assumed that in order to exist, each and every onset must be licensed by a nucleus. However, in certain forms this nucleus is not expressed. Whether the final V position is pronounced is parametrically regulated:

(5) Final Empty Nucleus (FEN) parameter:
Govern the final empty nucleus: [OFF]/ON

(5) is said to work to the effect that there are systems where all domains surface as ending in vowels, such as Italian or Maori, and there are languages where words end either in vowels or in consonants, such as English or Hebrew. Once a novelty, nowadays the idea of empty categories in phonology is fairly established and for the theories like CVCV, it is a null hypothesis.

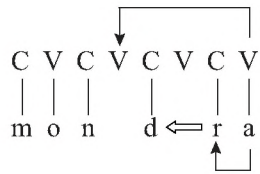
The third means that CVCV utilizes to ensure that empty categories remain unexpressed is Infrasegmental Government (IG). IG is a relation that takes place optionally (it may but does not have to take place when its conditions are fulfilled) at the level of melodic structure. It is licensed by a nuclear position that follows the second member of the IG domain. It is always headed by a sonorant due to a particular melodic make-up of this type of segments. Being subject to a relation established at the level of phonological primes, empty categories that are subject to IG seem to be invisible to certain phonological processes taking place at the level of skeleton and above it. For example, in Polish forms like /mondra/ 'clever$_{\text{F.SG.NOM}}$', where /d/ and /r/ participate in an IG relation, the empty nucleus is invisible to Internuclear Government, the source of which is the final V position.[2] For the sake of clarity, let us provide the representation for /mondra/:[3]

[1] For a detailed discussion and the impressive body of empirical evidence supporting the existence of final empty nuclei see Kaye (1990), Harris (1994), and Gussmann and Harris (1998).

[2] Another process for which nuclei enclosed within IG domains are invisible is stress assignment (Scheer 2004: 597-623).

[3] Only necessary structural relations are included in (6).

(6) Representation for Polish /mondra/:



where:

- (Internuclear) Government
- Government Licensing (GL)
- Infrasegmental Government

In /mondra/ in (6), /d/ is governed by /r/, licensed to be head of the infrasegmental relation by the following V position. The nucleus enclosed within the IG domain is not pronounced. Crucially, it is also invisible to Government, which is directed at the preceding nucleus and allows it to exist and to remain silent.

To sum up, CVCV employs three mechanisms for the empty V positions to remain silent: Internuclear Government, FEN parameter and Infrasegmental Government. The first of them is an asymmetrical internuclear relation. It is head-final (left-directional) and its head is required to be phonetically expressed. The government that targets final nuclei is parametrically regulated. Therefore, final nuclei are either allowed to remain silent or obliged to surface phonetically. Finally, IG is another head-final relation, this time between consonants. It ensures that a nucleus is not only unexpressed but also invisible to Government. To exist, by virtue of IG it must be licensed by a following, expressed nucleus (Scheer 1998 and 2004). Now let us move on to a brief introduction of the possible processes within CVCV.

4. Phonological processes in CVCV: HIGH vs. LOW causality

In CVCV, there are two distinct areas of causality that may trigger phonological processes: HIGH and LOW. The processes triggered by the first one are traditionally referred to as syllabically-driven processes. The LOW(ER) processes can be characterized as triggered by and taking place at the level of melody. The HIGH (or UPPER) area is responsible for syllabic motivation for spreading (composition) or delinking (decomposition) of a given segment, the two operations available in CVCV that are of interest here. The forces avail-

able at the HIGH area have already been introduced as Licensing and Government. Some important characteristics of HIGH causality are: directionality (only regressive) and irrelevance of the melodic aspect of the source of a lateral relation (the trigger are V positions, not their quality). Although both government and licensing may have important consequences for the melodic make-up of their target, the exchange of primes between segments remains the function of the LOW(ER) part of the representation. Other important features of the LOW(ER) area are the adjacency of the trigger and the target and the fact that the melody-driven prime exchange may take place in both directions.

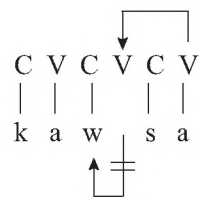
According to Scheer (2004), from which the above-mentioned criteria are adopted, a phonological process may be either exclusively HIGH or LOW in nature. An example of the former is /l/-vocalization in Brazilian Portuguese, where a liquid is deprived of melody and pronounced as a semivowel before a governed nucleus. This process is presented in (7):

(7) Examples of /l/-vocalization in Brazilian Portuguese:

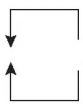
V_V	V_C	_#	
sa[ɬ]eiro	sa[w]gar	sa[w]	'salt cellar / to salt / salt'
ca[ɬ]adu	ca[w]sa	ca[w]	'who is silent/trousers/lime'
ma[ɬ]a	ma[w]vado	ma[w]	'suitcase, nasty, badly'
mu[ɬ]a	sa[w]co	su[w]	'mule, furrow, South'
vi[ɬ]a	fi[w]tro	vi[w]	'town, filter, mean'

In (7), the lateral deprived of Licensing (being followed by a governed nucleus) is weakened to [w]. The detailed examples of the process in question are shown in (8). The crossed line denotes lack of a given lateral force:

(8) /l/-vocalization in Brazilian Portuguese:



where:



– Internuclear Government

– Licensing

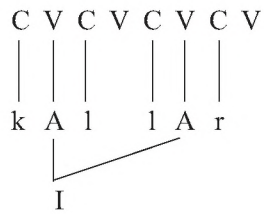
An example of a process triggered only by melody is vowel harmony in Turkish. Relevant data from Charette and Goksel (1998) are presented in (9):

(9) Vocalic harmony in Turkish:

Stem	Gloss	Plural
kil	'clay'	kil-ler
kʏl	'ash'	kʏl-ler
kul	'subject'	kul-lar
kel	'bald patch'	kel-ler
kol	'arm'	kol-lar

In Turkish, all vowels within a domain must agree as to backness. Thus, the vowel alternant in the plural suffix depends on the quality of the vowel in the stem. This is analyzed as spreading of the [front] feature, which is represented in (10) as a monovalent prime:

(10) Vowel harmony in Turkish /keller/:



In (10), the monovalent prime that stands for frontness spreads right, on the prime that represents backness. The combination of the two primes is phonetically interpreted as /e/. What is important here is that the forces working in the UPPER area play no part in the process and, consequently, reference to them is avoided in the representation.

Both processes triggered by UPPER and LOWER causalities are subject to certain language-specific restrictions called Licensing Constraints. However, it is probably worth mentioning that the HIGHER processes are much more predictable, whereas the processes that take place at the level of melody are generally characterized by a high level of idiosyncrasy.

5. Summary

In this short paper, I have presented the basic tenets and theoretical machinery employed by CVCV phonology. To be more precise, I have introduced the concepts of syllabic constituent structure, Government and Licensing, the existence and motivations for Empty Nuclei and such aspects of ECP as Internuclear Government, the FEN parameter and Infrasegmental Government. Finally, I have given a taste of what phonological processes are possible in CVCV and I have classified them in accordance with their motivation. Readers interested in further discussion and functioning of CVCV are referred to studies listed in the References.

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